IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

CHANG-HYEON LEE

Serial No.:	*to be assigned*	Examiner:	*to be assigned*
Filed:	2 April 2004	Art Unit:	*to be assigned*

For: APPARATUS AND METHOD FOR DETECTING AN ABNORMALITY IN A RECORDED SIGNAL

INFORMATION DISCLOSURE STATEMENT

Mail Stop Patent Application
Commissioner for Patents
P.O.Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with 37 C.F.R. §1.56, and §§1.97 and 1.98 as amended, Applicant cites the following art references. These references were cited, either Applicant or the Examiner, in the earlier application, Serial No. 09/789822 filed on 22 February 2001, on which the present continuation application is based. Also, it is respectfully submitted that the information disclosure statement(s) filed in the aforesaid earlier application complies with 37 C.F.R. §1.98(a)(b).

In view of the above, it is submitted that, under 37 C.F.R. §1.98(d), copies of these references are not enclosed.

1. U.S. Patent No. 6,163,421 to Shinpuku *et al.*, entitled *AZIMUTH MAGNETIC RECORDING AND REPRODUCING APPARATUS AND METHOD EMPLOYING WAVEFORM EQUALIZATION*, issued on December 19, 2000;
2. U.S. Patent No. 5,291,342 to Kim, entitled *MULTIFUNCTIONAL CONTROL TYPE*

VIDEO HEAD SELECTING DEVICE AND METHOD THEREOF, issued on March 1, 1994;

3. U.S. Patent No. 6,134,384 to Okamoto *et al.*, entitled *DIGITAL SIGNAL RECORDING/REPRODUCING APPARATUS AND RECORDING METHOD*, issued on October 17, 2000;
4. U.S. Patent No. 6,141,164 to Ishibashi *et al.*, entitled *DATA RECORDING/REPRODUCING APPARATUS EMPLOYING READ-AFTER-WRITE SYSTEM*, issued on October 31, 2000;
5. U.S. Patent No. 4,849,979 to Maccianti *et al.*, entitled *FAULT TOLERANT COMPUTER ARCHITECTURE*, issued on July 18, 1989;
6. U.S. Patent No. 6,141,486 to Lane *et al.*, entitled *METHODS AND APPARATUS FOR RECORDING DIGITAL DATA INCLUDING SYNC BLOCK AND TRACK NUMBER INFORMATION FOR USE DURING TRICK PLAY OPERATION*, issued on October 31, 2000;
7. U.S. Patent No. 5,438,459 to Suga *et al.*, entitled *METHOD OF PROCESSING AND RECORDING DATA WHILE REPRODUCING THE SAME AND APPARATUS FOR THE METHOD*, issued on August 1, 1995;
8. U.S. Patent No. 5,018,036 to Yamashita, entitled *ROTARY HEAD TYPE MAGNETIC RECORDING AND REPRODUCING APPARATUS WITH DEDICATED RECORDING AND REPRODUCING MAGNETIC HEADS*, issued on May 21, 1991;
9. U.S. Patent No. 5,479,098 to Yokoyama *et al.*, entitled *LOOP-BACK CIRCUIT FOR TESTING A MAGNETIC RECORDING SYSTEM WITH SIMULTANEOUS READ AND WRITE FUNCTIONS*, issued on December 26, 1995;
10. U.S. Patent No. 5,966,279 to Shimura *et al.*, entitled *ROTARY MAGNETIC HEAD INSPECTION METHOD*, issued on October 12, 1999;
11. U.S. Patent No. 5,535,065 to Tanizawa, entitled *RECORDING AND REPRODUCING APPARATUS HAVING MEANS FOR PERFORMING DIAGNOSTIC FUNCTIONS*, issued on July 9, 1996;

12. U.S. Patent No. 3,864,736 to Hazzard, entitled *MAGNETIC RECORDING VERIFICATION*, issued on February 4, 1975;

13. U.S. Patent No. 5,923,485 to Ito, entitled *STORAGE DEVICE FO RELIABLY MAINTAINING DATA IN A REPRODUCIBLE SATE FOR A LONG PERIOD FO TIME*, issued on July 13, 1999; and

14. U.S. Patent Application No. 2001/0013985 to Baba *et al.*, entitled *METHOD AND APPARATUS FOR DETECTING ABNORMAL MAGNETIC HEAD FLY HEIGHT*, issued on August 16, 2001.

JAPANESE PATENT REFERENCE:

Publication No.	Inventor	Published Date
• Hei 06-76552	Yamamoto	18 March 1994

"Recording/ Reproducing Device"

and English language Abstract for Hei 06-76552

• Hei 10-31807	Shimura	3 February 1998

"Read-After-Write Circuit And Magnetic Recording And Reproducing Circuit"

and English language Abstract for Hei 10-31807

OTHER DOCUMENTS:

- *Communication* and *Partial Search Report* issued by the European Patent Office on the 18th of March 2003 in corresponding co-pending European patent application assigned serial No. EP 01 30 9243.

DISCUSSION

Shinpuku *et al.* '421 relates to an apparatus for azimuth-recording data on a magnetic recording medium. Heads (13a) and (13b) having azimuth angles different from each other are used and data are recorded on and reproduced from a plurality of adjacent tilted recording tracks on a magnetic tape T. A recording-system encoder (23) converts data to a code sequence in which null

points of frequency spectrums are respectively provided at null points of waveform equalization characteristics of partial responses such as PR1, PR4, etc. For example, record-coding using a 8/10MSN code is performed. A reproduction-system equalizing circuit (28) performs waveform equalization based on the partial responses. Further, a data detector (29) detects the data by a Viterbi coding method for executing state transition during which the characteristic of the code sequence is adopted. Azimuth-recording in a narrow track width can be easily achieved while a reduction in effective recording speed due to an increase in the azimuth angle is being controlled.

Kim '342 relates to a multifunctional control device and method used to determine a head channel selecting signal for playback heads of a video tape recorder and for controlling a phase shift direction of a video signal according to a desired reproduction mode. The video tape recorder has four heads, a first pair for use during standard play and a second pair for use during super long play. The heads read out recorded video signals and a first switch is connected to the first pair of heads and a second switch is connected to the second pair of heads for selectively providing outputs to corresponding amplifiers, under control of a servo controller. A third switch is connected to the outputs of the amplifiers for providing outputs under control of a microcomputer. The microcomputer controls the servo controller which in turn controls the speed of a drum motor and a capstan motor. The microcomputer also provides a phase shift direction controlling signal. An output of the servo controller is provided to the microcomputer along with an output of a comparator comparing the outputs of the amplifiers.

Okamoto *et al.* '384 relates to an apparatus and method for recording on and reproducing from a magnetic tape a digital signal by rotating heads. A synchronizing signal, a control signal, and an error correction code are added to the digital signal, and the digital signal with those signals added is converted into a block form. At the recording time, a recording signal produced from a recording circuit is recorded on the recording medium by a first head of the rotating heads, and at the same time the recorded signal is reproduced by a second head of the rotating heads. In addition, there are provided a first recording mode in which two error correction codes are added, and a second

recording mode in which three error correction codes are added. Thus, the recorded signal can be confirmed by the simultaneous playback made at the recording time so that the reliability in data can be assured.

Ishibashi *et al.* '164 relates to a recording apparatus provided on, for example, a digital audio tape recorder or on a data storage device for correctly and reliably recording data. An ECC unit 23 appends the parity for error correction to recording data and transmits the resulting data to recording heads Hw1, Hw2, while recording the parity in a RAM 61. The recording data and the parity are reproduced from a magnetic tape 32 by magnetic heads Hr1, Hr2 and supplied to a subcode separation unit 45. A syndrome detection unit 62 detects the number of error corrections performed by parity by an error correction unit 46. A system controller 63 compares the number of times of error corrections to a threshold value and compares the parity read out from the RAM 61 to the parity from the sub-code separation unit 45 in order to detect if the recording data has been recorded correctly. If the recording data has not been recorded correctly, the system controller controls a recording/reproducing unit 30 for re-recording the same recording data.

Macianti *et ali.* '979 relates to a fault tolerant computer architecture in which a functional unit is duplicated and the input and output signals to and from the two units are compared with each other by comparators to provide an error signal in case of different behavior of the two units, resulting in different input/output signals. The operation of both functional units is controlled by a first read only control memory or alternatively by a second read/write control memory once it has been loaded with microprograms, under control of the first read only control memory. The correct behavior of the comparators is tested in a diagnostic mode by having one functional unit operated under control of the first memory and the other functional unit operated under control of the second memory, so that the two units are controlled to perform different functions which force the comparators to produce an error indication, the absence of which indicates that the comparators operation is faulty.

Lane *et al.* '486 relates to a digital video tape recorder ("VTR") and servo circuit for supporting the display of images during trick play VTR operation. The digital VTR, in one embodiment, having a single pair of heads of alternating azimuths located on a head cylinder one track width apart. The digital VTR records data that can be used to generate images during trick play tape speeds and directions of operation in fast scan tracks defined by the paths the single pair of heads trace over the tape during trick play operation. Each fast scan track crosses multiple normal play tracks. Sync blocks and track identification information are recorded on the tape along with video data. To align the heads with the appropriate fast scan track during trick play operation, a lookup table containing information on the pattern of fast scan tracks recorded on the tape is used. The information stored in the look-up table is compared to sync block number and track number information recorded on the tape to determine haw much the position of the tape must be adjusted to align the heads with the prerecorded fast scan tracks on the tape for the any selected speed and direction of digital video tape recorder operation.

Suga *et al.* '459 discloses that the precedingly reproduction signal reproduced by a precedingly reproducing head is recorded on a tape. If it is detected that the reproduction signal includes abnormality owing to a reason such as poor error rate, the recording operation is stopped. Then, for retrial of the recording, the information on the position where the abnormality has occurred is held. A memory may be provided to always rewrite and store the signal reproduced by the precedingly reproducing head, and also a simultaneously reproducing head which is different from the precedingly reproducing head may be provided to immediately monitor the recording state of the signal recorded on the tape. If it is detected that the signal reproduced by the simultaneously reproducing head includes abnormality, the recording operation is stopped, the information on the position where the abnormality has occurred is held. Further, the rewrite operation in the memory is stopped and the original precedingly reproduction signal corresponding to the signal to be recorded at the position where the abnormality has occurred is held in the memory

Yamashita '036 discloses a rotary head type magnetic recording and reproducing device in

which a rotary drum is provided with a pair of magnetic heads arranged at an angle of 180.degree. and a further pair of magnetic heads deviated in phase angle from the first mentioned magnetic heads and arranged at an angle of 180.degree. from each other, and a widening angle of a tape in contact with the drum is smaller than the phase angle, one pair of magnetic heads being exclusive for recording while the other pair of magnetic heads being exclusive for reproducing. A gap length of the magnetic head exclusive for reproducing is longer than that of the magnetic head for recording.

Yokoyama *et al.* '098 discloses that in a magnetic recording system, a loop-back test circuit provides a technique to test a magnetic recording head, a read circuit, and a write circuit to a read-write head, is sensed through the voltage generated at the head by the test current, such that a small voltage portion of the test signal is transferred through a resistor toga read circuit. The voltage portion is then filtered through a capacitor to form detectable peaks such that the read signal is generated with pulses corresponding to the peaks.

Shimura *et al.* '279 relates to a rotary magnetic head inspection method for a double azimuth head where two magnetic heads of different azimuthal angles are arranged on a head base, which includes the steps of: recording an inspection signal on a running tape by a magnetic head; reproducing the inspection signal by the magnetic head for checking the level of the reproducing signal; and reproducing the inspection signal by the other magnetic head for checking whether the magnetic head is correctly assembled onto a head base through judgement of the reproducing signal.

Tanizawa '065 relates to an apparatus for recording and reproducing a signal on and from a record medium, which includes a reproducing system signal processing circuit (21) for reproducing a recorded information, an output circuit (25) for outputting a reproducing digital audio signal thus reproduced in the form of a predetermined format, an input circuit (29) for converting a signal input from the outside into a signal of a predetermined format and a recording system signal processing circuit (35) for recording at least an information. This apparatus includes switches (20), (23), (27) and (32) for selectively switching the recording and reproducing lines or input and output lines.

Since the recording and reproducing lines or input and output lines are selectively switched, all portions that should be diagnosed can be diagnosed. Also, a circuit size can be reduced and a space factor can be improved. Hence, manufacturing cost can be reduced.

Hazzard '736 relates to an apparatus and method for bit by bit verification of digital data, serially recorded onto a magnetic medium wherein data verification occurs immediately upon recording. Data, traveling serially to a recording head, may be sampled in parallel-bit characters which in turn can be stored while that data is being recorded. Recorded data may then be read from the medium and compared with the stored characters to verify the accuracy of the recording wherein each bit of each character, in the serial order of its recording, can be compared with the corresponding data bit read from the medium. The entire recording and comparison process may be conducted in synchronism with strobe pulses recorded on the medium.

Ito '485 relates to a time counting device, a cache memory and a copy control circuit which are added to a conventional disk drive so that recorded information is copied periodically and automatically. Alternatively, a cache memory, a copy control circuit, a reference control circuit, a first time counting device and a second time counting device are added to the conventional disk drive so that information which remains recorded for a predetermined period of time after its last recording date is automatically copied. According to another embodiment, a reference signal is recorded in advance and a reproduced output is periodically measured. If the reproduced output is lower than a reference value, recorded information is automatically copied. According to yet another embodiment, the temperature in the disk drive is measured by a thermometer 18, and if the temperature is higher than a reference value, information is automatically copied at shorter intervals than when the temperature is less than the reference value. Other embodiments are also disclosed with the aim of ensuring that information recorded on a magnetic media can always be reproduced reliably, even in the case of high density recording.

Baba *et al.* '985 relates to a method and apparatus for detecting an abnormal fly height of a

magnetic head. The method includes reproducing a servo signal recorded on a magnetic disk in advance by the magnetic head when a write operation for writing data on the magnetic disk by the magnetic head is initiated. Next, the gain of the servo signal based on the head part of the servo signal reproduced by the magnetic head is determined. The gain of the servo signal is then compared with a reference value to detect an abnormal fly height of the magnetic head. In an advantageous embodiment, the reference value is the gain of a servo signal determined when the fly height of the magnetic head is normal. Alternatively, in other advantageous embodiments, the reference value is based on the gain of a previous servo signal.

Yamamoto JP '552 was said by the European Patent Office Examiner to be "particularly relevant if taken alone." Yamamoto JP '552 discusses the record regenerative apparatus which uses a magnetic tape, a disk, etc. as a record medium to confirm a recording condition and to unnecessitate the constant monitoring if a monitor by controlling a timing between a recording signal and a reproduced signal immediately after a recording and detecting a recording error comparing corresponding data.

Shimura JP '807 was also said by the European Patent Office Examiner to be "particularly relevant if taken alone." Shimura JP '807 mentions a magnetic recorder and reproducing devices, such as a dat streamer tape drive equipped with the read-after-write function, especially relates to a read-after-write circuit to decrease the cost of a circuit by reducing the circuit scale of the read-after-write reproducing system.

The citation of the foregoing references is not intended to constitute an assertion that other or more relevant art does not exist. Accordingly, the Examiner is requested to make a wide-ranging and thorough search of the relevant art.

No fee is incurred by this Statement.

Respectfully submitted,

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INFORMATION DISCLOSURE STATEMENT PTO-1449 (PAGE 1 OF 1)	SERIAL NUMBER	DOCKET NO. P57062
	APPLICANT CHANG-HYEON LEE	
	FILING DATE 2 April 2004	GROUP

U.S. PATENT DOCUMENTS

EXAMINER	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE
	6,163,421	12/00	Shinpuku *et al.*			
	5,291,342	03/94	Kim			
	6,134,384	10/00	Okamoto *et al.*			
	6,141,164	10/00	Ishibashi *et al.*			
	4,849,979	07/89	Maccianti *et al.*			
	6,141,486	10/00	Lane *et al.*			
	5,438,459	8/95	Suga et al.			
	5,018,036	5/91	Yamashita			
	5,479,098	12/95	Yokoyama et al.			
	5,966,279	10/99	Shimura et al.			
	5,535,065	7/96	Tanizawa			
	3,864,736	2/75	Hazzard			
	5,923,485	7/99	Ito			
	2001/0013985	8/01	Baba et al.			

FOREIGN PATENT DOCUMENTS

						TRANSLATION	
	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	YES	NO
	JP 06-76552	03/94	Japan			✔	
	JP 10-31807	02/98	Japan			✔	

OTHER DOCUMENTS *(Including Author, Title, Date, Pertinent Pages, etc.)*

	"Communication" and "Partial Search Report" issued by European Patent Office dated on 18 March 2002

EXAMINER:	*DATE CONSIDERED:*

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP §609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.